



Eckert & Ziegler

Isotope Products

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CERTIFICATE OF CALIBRATION MULTINUCLIDE STANDARD SOURCE

Customer: CANBERRA INDUSTRIES INC
P.O. No.: 4027433
Catalog No.: EG-LINE

Source No.: H6-985
Reference Date: 15-Feb-11 12:00 PST
Contained Radioactivity: 50.44 μ Ci 1866 kBq

Physical Description:

A. Capsule type: Line source (9.53 mm OD x 813 mm long)
B. Nature of active deposit: Multinuclide distributed in 1.0 g/cc epoxy matrix
C. Active diameter/volume: 5.49 mm diameter x 809 mm long (19.21 grams of epoxy)
D. Backing: Aluminum
E. Cover: Aluminum

Gamma-Ray Energy (keV)	Nuclide	Half-life	Branching Ratio (%)	Activity	Gammas per second	Total Uncert.
60	Am-241	432.17 \pm 0.66 years	36.0	10.28 μ Ci (380.4 kBq)	136900	3.0 %
303	Ba-133	3862 \pm 15 days	18.3	30.20 μ Ci (1117 kBq)	204500	3.0 %
356	Ba-133	3862 \pm 15 days	61.94	30.20 μ Ci (1117 kBq)	692100	3.0 %
662	Cs-137	30.17 \pm 0.16 years	85.1	4.958 μ Ci (183.4 kBq)	156100	3.0 %
1173	Co-60	5.272 \pm 0.001 years	99.86	5.001 μ Ci (185.0 kBq)	184800	3.0 %
1333	Co-60	5.272 \pm 0.001 years	99.98	5.001 μ Ci (185.0 kBq)	185000	3.0 %

Method of Calibration:

This source was prepared from weighed aliquots of solutions whose concentrations in μ Ci/g were determined using gamma spectrometry (Am-241) and a pressurized well type ionization chamber (Ba-133, Cs-137, and Co-60).

Notes:

- See reverse side for leak test(s) performed on this source.
- EZIP participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (as in NRC Regulatory Guide 4.15).
- Nuclear data was taken from IAEA-TECDOC-619, 1991.
- Overall uncertainty is calculated at the 99% confidence level.
- This source has a working life of 5 years.
- ISO 2919 Classification: ISO/99/C22212(7)


Quality Control

18-Jan-11
Date

EZIP Ref. No.: 1480-97

ISO 9001 CERTIFIED

Medical Imaging Laboratory

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Industrial Gauging Laboratory

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